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INTENSIFICATION OF MASS TRANSFER WITH CHEMICAL REACTION IN CONDITIONS OF INTERFACIAL CONVECTION FOR SPRAY EXTRACTORS

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Abstract. Studies of mass transfer with a chemical reaction through a spherical interface on a single drop have shown a significant effect of spontaneous interfacial convection on the mass transfer rate.[1]

Mass transfer with chemical reaction was investigated in the system sodium hydroxide aqueous solution (continuous phase) / butyric acid (transferred component) / carbon tetrachloride (dispersed phase) in spray extractors. It was shown that chemo capillary instability reduces the height of transfer unit significantly. Conditions of beginning of spontaneous interfacial convection when drops move constrainedly were found.

Table 1. Effect of the initial concentration of the transferred substance on the value of VEP in the spray column (system carbon tetrachloride + butyric acid – aqueous solution of sodium hydroxide)

C_0, kmole/m^3	The amount of substance transferred in the interfacial instability mode, %	The amount of substance transferred in the "diffusion" mode, %	VEP_{smc} ($K_м = K_{ср}$), m	$VEP_{diff.}$ ($K_м = K_D$), m	VEP_{gen}, m
0,099	49,49	50,51	1,08	13,62	7,41
0,302	33,86	66,14	0,67	2,73	2,03
0,501	58,08	41,92	0,55	1,92	1,12
0,990	71,72	28,28	0,50	2,40	1,04

References

1. Treybal,R. E. Liquid mining : Pro. from english / Post. d-r tech. S. Z. Kagan, – Moscow: Chemistry, 1966, – 724 P.